

Claims:

The embodiments of the invention in which an exclusive property or privilege is claimed are, therefore, defined as follows:

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1. A method of cleaning comprising the steps of: selecting a substantially non-reactive, non-aqueous, non-oleophilic, apolar working fluid; selecting at least one washing adjuvant; bringing said working fluid and adjuvant in contact with the fabric; and applying mechanical energy to provide relative movement within said fabric.
2. The method of claim 1 wherein said non-reactive, non-aqueous, non-oleophilic, apolar working fluid under standard conditions is further characterized by: a KB value less than approximately 30; a surface tension less than approximately 35 dynes/cm²; and a solubility in water less than 10%.
3. The method of claim 1 in which substantially all materials in contact with said working fluid are selected from the commercial group of non-spark generating materials
4. The method of claim 1 in which substantially all of the materials contacted by said working fluid are conductive polymers.
5. The method of claim 1 wherein said mechanical energy occurs in a chamber which confines said working fluid and fabric.
6. The method of claim 5 including the step of introducing a water-in-working fluid emulsion to the chamber which confines the fabric and said working fluid.

7. The method of claim 6 wherein at least one dispensing chamber is provided and adjuvant is added to said chamber at appropriate times.
8. The method of claim 7 including the step of introducing a water-in-working fluid emulsion into the adjuvant-dispensing chamber.
9. The method of claim 1 including the step of introducing a water-in-working fluid emulsion to the fabric prior to bringing the working fluid in contact with the fabric.
10. The method of claim 1 including the step of detecting the level of said working fluid in contact with the fabric for appropriate adjustment of subsequent steps in the cleaning method.
11. The method of claim 1 including the step of sensing the initial moisture content of the fabric for subsequent adjustment of steps in the cleaning method.
12. The method of claim 11 wherein the above sensing step is carried out by sensing the humidity of the fabric to be cleaned.
13. The method of claim 11 wherein the above sensing step is carried out by sensing the conductivity of the fabric.
14. The method of claim 11 wherein the above sensing step is carried out by sensing the humidity of the air.

15. The method of claim 11 wherein the above sensing step is carried out inside the chamber.

16. The method of claim 1 wherein the temperature inside the chamber is sensed and means are taken to ensure that the temperature does not exceed 30 °F below the flash point of said working fluid unless the concentration of said working fluid does not exceed its lower flammability limit.

17. The method of claim 1 wherein the washing adjuvant is selected from a group consisting of: builders, surfactants, enzymes, bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pro-perfumes, finishing aids, lime soap dispersants, composition malodor control agents, odor
5 neutralizers, polymeric dye transfer inhibiting agents, crystal growth inhibitors, photobleaches, heavy metal ion sequestrants, anti-tarnishing agents, anti-microbial agents, anti-oxidants, linkers, anti-redeposition agents, electrolytes, pH modifiers, thickeners, abrasives, divalent or trivalent ions, metal ion salts, enzyme stabilizers, corrosion
inhibitors, diamines or polyamines or alkoxylates, suds stabilizing polymers, solvents,
10 process aids, fabric softening agents, optical brighteners, hydrotropes, water, suds or foam suppressors, suds or foam boosters, fabric softeners, antistatic agents, dye fixatives, dye abrasion inhibitors, anti-crooking agents, wrinkle reduction agents, wrinkle resistance agents, soil release polymers, soil repellency agents, sunscreen agents, anti-fade agents and mixtures thereof.

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18. The method of claim 17 wherein a preferred surfactant for the system will have a hydrophilic-lipophilic balance from approximately 3 to 14.

19. A method of cleaning comprising the steps of: selecting a substantially non-reactive, non-aqueous, non-oleophilic, apolar working fluid; selecting at least one washing adjuvant; bringing said working fluid and adjuvant in contact with the fabric; applying mechanical energy to provide relative movement within said fabric; separating said working fluid from the fabric; cooling the working fluid for decreasing the dissolved soils in the working fluid; and filtering said working fluid.
20. The method of claim 19 wherein said non-reactive, non-aqueous, non-oleophilic, apolar working fluid under standard conditions is further characterized by: a KB value less than approximately 30; a surface tension less than approximately 35 dynes/cm²; and a solubility in water less than 10%.
21. The method of claim 19 including the step of filtering the permeate from the above step through a filter described in paragraph 82 of the specification.
22. The method of claim 21 including the further step of filtering the permeate from the above step through a filter described in paragraph 79 of the specification.
23. The method of claim 19 wherein vapors from said working fluid are treated by a high speed spinning disc which removes said working fluid and water vapor from the air stream.
24. The method of claim 23 including the step of cooling the vapor contacted by the spinning disc.

25. The method of claim 19 wherein said working fluid may have impurities of not more than approximately 20 %.

26. The method of claim 19 wherein the washing adjuvant is selected from a group consisting of: builders, surfactants, enzymes, bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pro-perfumes, finishing aids, lime soap dispersants, composition malodor control agents, odor neutralizers, polymeric dye transfer inhibiting agents, crystal growth inhibitors, photobleaches, heavy metal ion sequestrants, anti-tarnishing agents, anti-microbial agents, anti-oxidants, linkers, anti-redeposition agents, electrolytes, pH modifiers, thickeners, abrasives, divalent or trivalent ions, metal ion salts, enzyme stabilizers, corrosion inhibitors, diamines or polyamines or alkoxylates, suds stabilizing polymers, solvents, process aids, fabric softening agents, optical brighteners, hydrotropes, water, suds or foam suppressors, suds or foam boosters, fabric softeners, antistatic agents, dye fixatives, dye abrasion inhibitors, anti-croaking agents, wrinkle reduction agents, wrinkle resistance agents, soil release polymers, soil repellency agents, sunscreen agents, anti-fade agents and mixtures thereof.

27. The method of claim 26 wherein a preferred surfactant for the system will have a hydrophilic-lipophilic balance from approximately 3 to 14.